The Impact
Of Sciences Of Islamic Civilization
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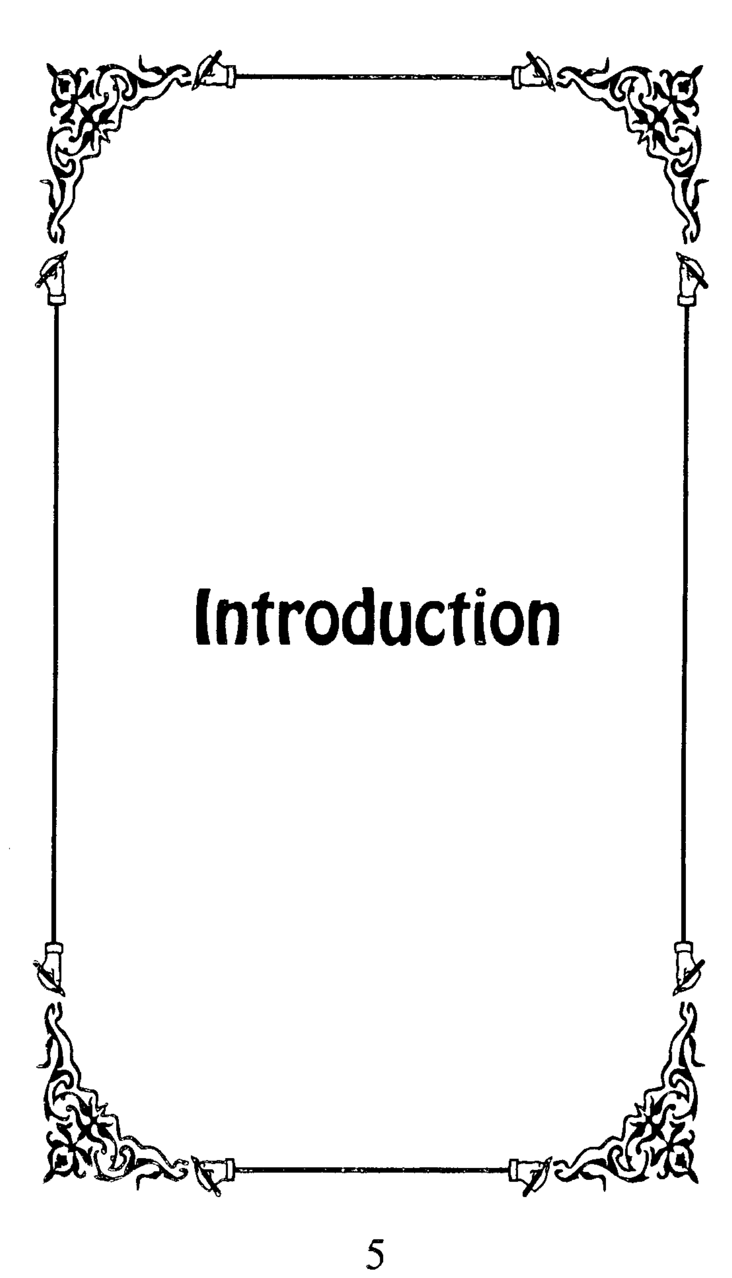
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Introduction

Man has never been far, in any of his history stages, from what can be considered as a practice of the reasoning process and dialogue with the other and employing them to overcome the problems of the reality in which he lived starting from the primitive age till the emergence of Islam.

Humanity lived the practice of what reasoning of thinkers and scientists produced over ages. This is what was termed as "civilizations" i.e. these which varied according to time and place

and progressed as an application of God's rule in his Earth:

"And if Allah (God) did not check one set of people by means of another, the earth would indeed be full of mischief. But Allah is full of bounty to the Alamin (mankind, jinn and all that exist".

(Surat Al-Bakra- verse No. 251).

God's rule necessitated that some civilizations may have cultural dominance in return for the inertia of the others for specified periods of time, then the tables are turned and so on while taking into consideration that the

‘checking’ rule of God determined as well in order to be achieved that human culture would wholly formulate a common series of links with nations so that each civilization would involve the principle of acquisition from its predecessor and giving to its successor. Hence, the matrix of human integrity would be realized.

Human civilization represents a rather important link, if not the most important link, in the series of human civilization whose construction cannot be completed

away from the fundamentals and principles the holy civilization.

Therefore, this study comes on "Islamic civilization" concentrating on most sciences which dominated it and the influence of these sciences on other civilizations. For this purpose, the study attempts to answer some questions representing its main hypotheses which are as follows: Did the Islamic scientific society witness interest in sciences during the flourish of its civilization?

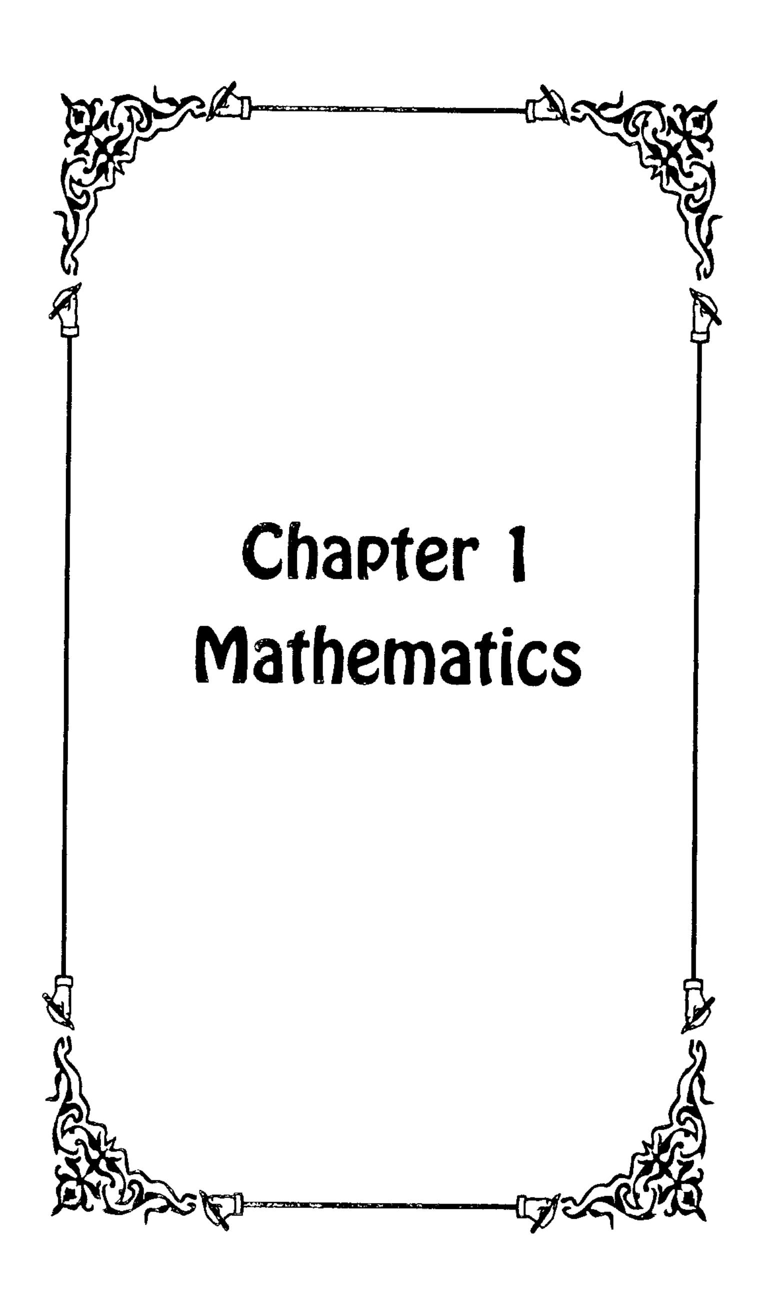
(1) What is the nature of sciences in Islamic environment at the beginning of its scientific renaissance?

(2) How did scientists deal with these sciences which most have traveled from other nations?

(3) Could these scientists invent new sciences that did not exist at the time of their ancestors?

(4) Did Arab and Muslim scientists provide original

additions to the sciences in which they explored that caused their development and progress and influenced the subsequent civilization and the rest of humanity in general?



Chapter 1
Mathematics

The study in the first chapter concerning Al-Khawarizmy (died 232 A. H/ 846 A.D) as a school of mathematics benefited humanity, show how this formulation influenced his academic achievements later. Then, I briefly discussed the scientific and historical development of mathematics in order to know the dimensions of the achievement that started by Al-Khawarizmy as the most important mathematician in the third century A.H. All this led me naturally to identify the dimensions of the achievements of

Muslim scientists during the age of Al-Khawarizmy in order to know the extent of the influence of Al-Khawarizmy on these scientists and more importantly the extent of the influence of the later by it. I found that the influence of Al-Khawarizmy extended to the Muslim mathematicians in subsequent ages.

Sanan Bin Al-Fath Al-Harany, the accountant who appeared at the beginning of 3rd Century A.H was the first to be influenced by Al-Khawarizmy as he was his contemporary. He studied his book

Algebra and apposition and fully understood it. When he got scientifically mature, he explained this book and called his scientific work "Explanation Book of Algebra and apposition of Al-Khawarizmy". Hence, he became a pioneer in the industry of mathematics and numbers. He introduced books other than the previous explanation: "Book of Takht in Indian Arithmetic", "Book of Addition and Division" and "Book of Addition's Explanation"

At the same age of Al-Khawarizmy (3rd Century A.H), another mathematician was prominent and who studied Al-Khawarizmy's books and was proud of this. He was Abo Kamel Shogaa Bin Aslam Al-Masry, Egyptian, who mastered Algebra and got a great fame to the extent that he was called professor of Algebra. Abo Kamel Al-Masry gives credit to Al-Khawarizmy, so he states in the introduction of his book which he called as well "Algebra and apposition" that the book of Mohamed Bin Mosa Al-

Khawarizmy known as the Book of Algebra and apposition is the most accurate mathematics book in origin and the most honest in measurement. We should therefore in the introduction to give him credit for knowledge and favour as he was the pioneer to the Book of Algebra and Apposition and the one who initiated and invented it for the origins it involved which God gave us access to what was closed. Its author left its explanation and interpretation; so many issues were branched out of it. Most of which exceed the six

kinds outlined by Al-Khawarizmy in his book. Hence, this made me try to reveal this and clarify it; thus, I wrote the book of "Algebra and Apposition and I showed its interpretation in the arithmetic book on "Numbers, Algebra and Apposition.

The influence of Al-Khawarizmy extends to the generations that followed his age. In the fifth Century A.H, we see Al-Karkhy (died 421 A.H/1030A.D) following the analytical method of Algebra and Apposition science following the

example of his both predecessors Al-Khawarizmy and Abi Kamel. His book "AlFakhry in arithmetic" is considered as the best book on Algebra in Middle Ages based on the book of Mohamed Bin Mosa Al-Khawarizmy (Algebra and Apposition). Al-Karkhy was among the innovative Muslim scientists who hated quoting and translation. He would prefer instead sorting, analysis and commenting on the books o others. He explained many ambiguous points in his book: "Book of Algebra and Apposition by Al-

Khawarizmy". Therefore, scientific pursue appears in its clearest form as from Al-Khawarizmy to Abi Kmael Al-Masry and from both to Al-Karkhy, their three works form a collective matrix indicating the development of mathematics with Muslim Scientists during an important period in the history of science.

The influence of Al-Khawarizmy extended to the western world as the authors of "Cambridge History of Islam" admitted that Al-Khawarizmy is

the principal responsible for the founding of Algebra science. The knowledge of the west of the book Algebra and Apposition came from Latin translations which were made of it. Gerard Alkarimony the Arabic manuscript of the Book of Algebra and Apposition to Latin language in the twelfth century A.D. Robert Chester translated it as well and it became the basis for the studies of major western mathematicians. Credit is given as well to other works of Al-Khawarizmy for transferring Arab-Indian numbers to the west as they

were named after him in the beginning “algorisms”. Then, the Germans changed Al-Khawarizmy to a name that can be easily pronounced, so they called him Algorizmus and they composed verses in Latin commenting on his theories and the mathematical rule “Algrithmus” still till today carries his name as its pioneer. Fredrick Rosen published “Book of algebra and Apposition” in 1831 A.D in London and Karnbisky published another translation adopted from Chester’s translation in 1915. Hence, it is clear that Al-

Khawarizmy's works in mathematics played in the past and present an important role for its progress as they were among the main sources by which Algebra and Arab numbers were transferred to the west. The science of Algebra is the greatest science invented by the human mind for what it involves of accuracy, precision and general standard rules. Al-Khawarizmy was the first to lay its basic foundations and preliminary origins as we know them today. From the above-mentioned, I could claim that Al-Khawarizmy is the

founder of an extending mathematical school which played an important role in the progress of mathematics since its establisher started this development when he moved from arithmetic to algebra and which the whole world admitted that he was its true founder. This is considered as the most prominent models of the influence of Islamic Civilization on Human civilization.

Human civilization was not limited to benefiting from Islamic civilization in Mathematics only; rather, scientists of the west

considered Thabet Bin Kera (died in 288 A.H-900 A.D) as the greatest Arab of all. He was the one who translated the seven books of the cones parts in the Apollonius eight books to Arabic, so he preserved for humanity three books of Apollonius cones whose Greek origins were lost. Among the geometrical achievements of Abi Sahl El-Kohy, he extracted with extreme excellence solutions for the hypotheses which Archimedes could prove and these solutions formulated importance in the history of geometrics.

Scientists of the west admitted that Abi El-Wafa El-Bozgany (died in388 A.H/ 998 A.D)was the first to lay the triangular relativity "shadow" and he was the first to employ in the solutions of mathematical problems and introduced the secant, and the cosecant. He found a new method for calculating sine tables which were characterized by their precision. In addition, El-Bozgany laid tables for the tangent. He put equations related to the sine of two angles. Through these discoveries, especially laying "shadow" in the

triangular relativity of the trigonometric percentage, El-Bozgany became in the view of the western scientists among the eternals as he established and laid one of the cornerstones on whih modern trigonometry was based.

Scientists of the west mentions that the method by which Omar El-Khayam (died in 515 A.H / 1121 A.D) solved equations of third class nearly appear by their literal text in the book of Descartes "Geometry". Omar El-Khayam is deemed as a follower of Sarton – the first to innovate the idea of

"categorization" as he categorized equations according to their class and according to the limits in them, restricted to thirteen kinds. Simon the Dutch (died in 1620) came in the seventeenth century A.D and he followed the categorization of Al-Khayam introducing some slight modifications. Thus, the scientists of the west attributed to him the idea of 'Categorization' overlooking its real creator Omar El-Khayam!

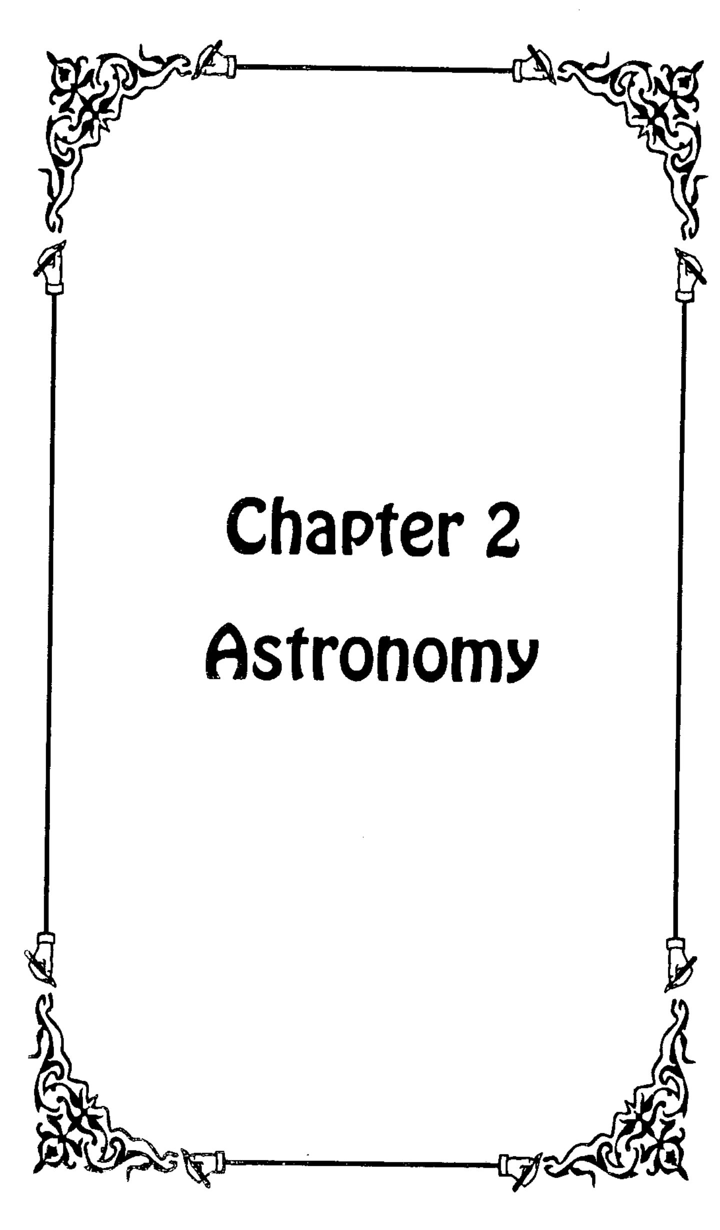
If the discrepancy among mathematicians is great, according

to Smith, however, the majority agree that Ghiath El-Deen El-Kashy (died in 839 A.H -1436 A.d) was the one who invented the decimal fraction as well as laying a rule concerned with determining the measurement of a side of a triangle based on measuring its two other sides and its opposite angle and a rule of the total natural numbers or the serial numerals raised to the fourth force. This was a rule that could not be attained by a little excellence, according to the view of Cradivou.

The study showed how humanity benefited by Nasier El-Din Al-Tousy (died 672 A.H- 1274 A.D) by his interest in non-Euclidian geometry which plays a role currently in the interpretations of the relativity theory and the study of space. Al-Tousy efficiently proved according to Derrick Setrik on the fifth requisition of Euclid. This was evidence by which he started a new age in the science of modern mathematics. Al-Tousy found and proved the total of the angles of the triangle is equal to two right

angles. This is equivalent to the fifth requisition of Euclid. Thus, Al-Tousy laid the basis of the modern non- Euclidian geometry which is associated with the names of western scientists such as the German Faus (died in 1855), the Russian Luba chovesky (died in 1856), Dolfakan Boliyee (died 1856) and the German Reeman (died 1866). The English Jaan walce is among the mathematicians of the west (died 1703) acknowledges the efforts of Nasier El-Din Al-Tousy in starting the non-Euclidian geometry after

he studied his evidence of the fifth requisition of Euclid. Howard Eaves stated that the Italian Grolasiker (died in 1733) who was called as the father of the non-Euclidian geometry basically depended on the work of Nasier El-Din Al-Tousy in this field of geometry.



Chapter 2
Astronomy

In the field of astronomy, the study show how Muslims were greatly interested in astronomy as a science that investigates the movements of stationary, moving and predisposed planets. These movements show the forms and positions of orbits which corresponded to these calculated movements geometrically. Astronomy scientists built astronomic observatories and put observatory devices and composed new ephemeras. They consist of mathematical tables showing positions and movements of stars.

Observatory machines used to be made in Abbasid age in the city of Heran. Then their manufacture spread all over the Abbasid Khilaphate since the time of Maamoun and the most important were: El-libna, Al-Halka El-eatadelia, zat El-Awtar and Astrolabe. Astronomy scientists kept studying, observing and writing at the observatories. Thus, they brought views and original theories that really expressed the spirit and civilization of Islam and from which all humanity benefited greatly.

Abo Maasher El-Balkhy (died in 272 A.H- 886 A.D) was known to the west as Abo Maser and his works were translated to Latin and were published several times especially the books: "the Great Introduction" and regulations of conversions of the years of the newly-born. Abo Al-abas Bin Kothyer El-Farghany (3rd Century A.H- 9th Century A.D) made several modifications of Astrolabe which he applied in measuring distances between planets and finding the numerical value of their volumes. Thus, he identified

diameters of some planets in comparison to the Earth diameter. He asserted that the volume of the moon is equal to 1/39 of that of the Earth and the volume of the sun is equal to 166 times of the earth, and the volume of Mars is equal to 15/8 of that of earth, and the volume of Jupiter is equal to 95 times of the earth and the volume of Saturn is equal to 90 times of earth. El - Faraghany's measurements remained applied all over the world till the ninth century A.H., fifteenth century A.D. in his book, Movement of the Sun,

Ibrahim Bin Sanan introduced several theories on the Sun and its movement, association of celestial bodies to its movement. He believed that the movement of the sun is celestial apparent and there is no way to control the movements of celestial bodies and the movement of the moon except after knowing the movement of the sun.

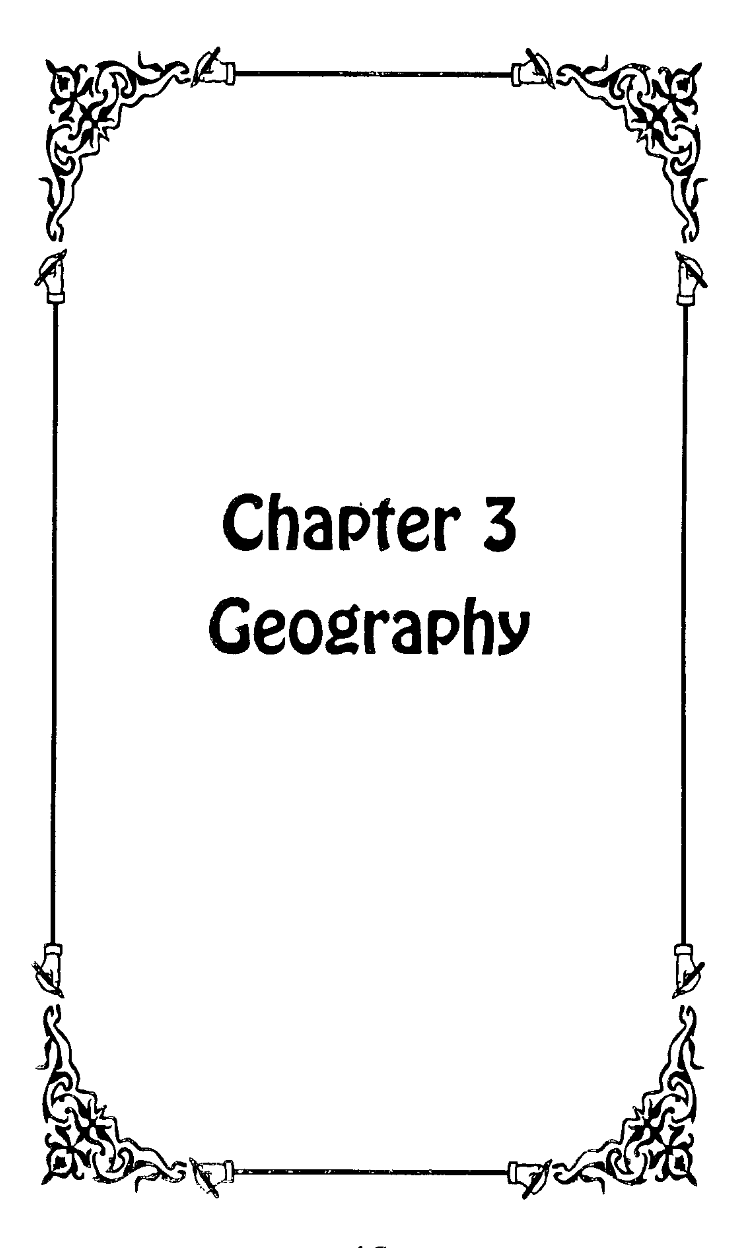
As for El-Batany who is known to the west as Albatenius (died in 317 A.H/939 A.D), he was the first to discover azimuth and nadir and determined their points

in the sky. In addition, he specified the length of the orbital year, seasons and real and medial orbit to the sun. He was preoccupied by investigating the locations of many stars and correcting observatory of the ancients concerning them. He laid his ephemeris known as Alsaby which was considered as the most correct ephemeris and was translated into Latin several times since the twelfth century and till the nineteenth century. This made the western scientists regard Al-Batany as one of the most

prominent astronauts over the ages.

Moreover, Nasier El-Din El-Tousy - according to George Sarton showed extreme and extraordinary excellence in approaching the issue of parallelisms in geometry. Among the problems he proved was a circle in contact with another from inside whose diameter is double of the former moving regularly in two opposite directions so that they are in contact with each other and the speed of the small circle is double that of the larger circle. He proved

as well that the contact point of the small circle moves on the diameter of the large circle. This theory is considered as the basis of the Astrolabe work.



Chapter 3
Geography

The Islamic conquests led to the increase of the interest of Khilphates in geography in order to know the borders of their khaliphate, its cities and villages and the roads leading to them to facilitate communication and mail between the central capital of Khilaphate and the rest of its regions. The phenomenon of journey seeking knowledge helped in its widespread besides the many trading journeys due to the economic development. All this led to the expansion of geographical researches and

activation of geographical compilation based on field studies. This is illustrated in Al-Yakouby's book "Book of Countries" which benefited the west and was published by the oriantalist Joeanpole in Leaden in 1861 as well as the oriantalist De Ghoi who published it in 1892 within the Geographical Library. In 1937, it was reviewed and published in French by Justine Viet.

The book "Al-Mmasalek w'almamlik' i.e. "Roads and kingdoms" by Ibn Kherdzaba (died in 300 A.H/912 A.D) was deemed

as the first complete Arabic book in descriptive geography as it included division of earth and wonders of the world and the famous buildings of the world. This book influenced subsequent geographers like Ibn Hawkl, Al-Masoudy and others. This influence extended to modern age, so De Ghoi published the book in Leaden in French in 1889.

As for the book "Al-Masalek w'almamlik' i.e. "Roads and kingdoms" by Astrokhy (died in the second half of 4^{th} Century A.H- the second half of 10^{th} Century

A.D), it was characterized by its maps as he assigned a map to each region individually. Here lies the importance of the book which G. H. Muller translated into Latin and De Ghoi published all of it in Leaden in 1870 in its capacity as the first volume of the Geographical Arabic Library Collection.

The book "Al-Masalek w'almamlik', i.e. "Roads and kingdoms", by Ibn Hawkl (died in the second half of 4th Century A.H- the second half of 10th Century A.D) included the characteristics

of earth formations and their volumes concerning length and width and regions of countries. This book is considered among the geographical Arabic books which benefited all mankind as it was translated into English and was printed in London in 1800. The parts concerned with Africa and Bolero were translated into French. The first was printed in Paris in 1842 whereas the other was printed in Paris in 1845. The Dutch orientalist De Ghoi published the whole book included in the Geographical Arabic Library

Collection in 1873 and Crimser published it in Leaden in 1938-1939.

The first Arabic Geographical dictionary arranged according to the alphabets was the "Dictionary of Strange Names of Countries and Places" by Al-Bakry (died in 487 A.H-1094) in which he dealt with names of countries and places stated in Koran and Hadith and ancient poetry and reports of the first conquests. The book is unique and unparalleled to anything else according to Donrie and serves as a fundamental reference for

whoever researches in Geography and ancient history. It was printed and published in Gowtingen in 1876 contrary to the Arabic edition.

The book of El-Idreesy (died 564 A.H/ 1160 A.D), "Tour of the Longing in Trespassing Horizons", was characterized by its inclusion of all regions of the world and the many accurate maps showing the places he described, included in the book. He drew maps on paper for the seven regions of the world after he divided each of them into ten portions, so the total became

seventy maps from which Muller extracted a comprehensive map of the world as drawn by El-Idreesy. The book was shortened and printed in Rome in 1952. Then the Zionist Gabriele and Hana Al-Hasrouny translated this condensed work into Latin and they published it in Paris in 1619. Kondi translated description of Andalusia into Spanish and was published with the Arabic manuscript in Madrid in 1799. Gubier published in Paris a great part of the book in French in 1840. Furthermore, Dozier

published the part concerned with Morocco, Sudan, Egypt and Andalusia in Leaden in 1864, and in Leipzig, Muller published description of Palestine and countries of Syria and Lebanon in 1882 and in Rome, Amlery published the part concerned with Italy in 1985.

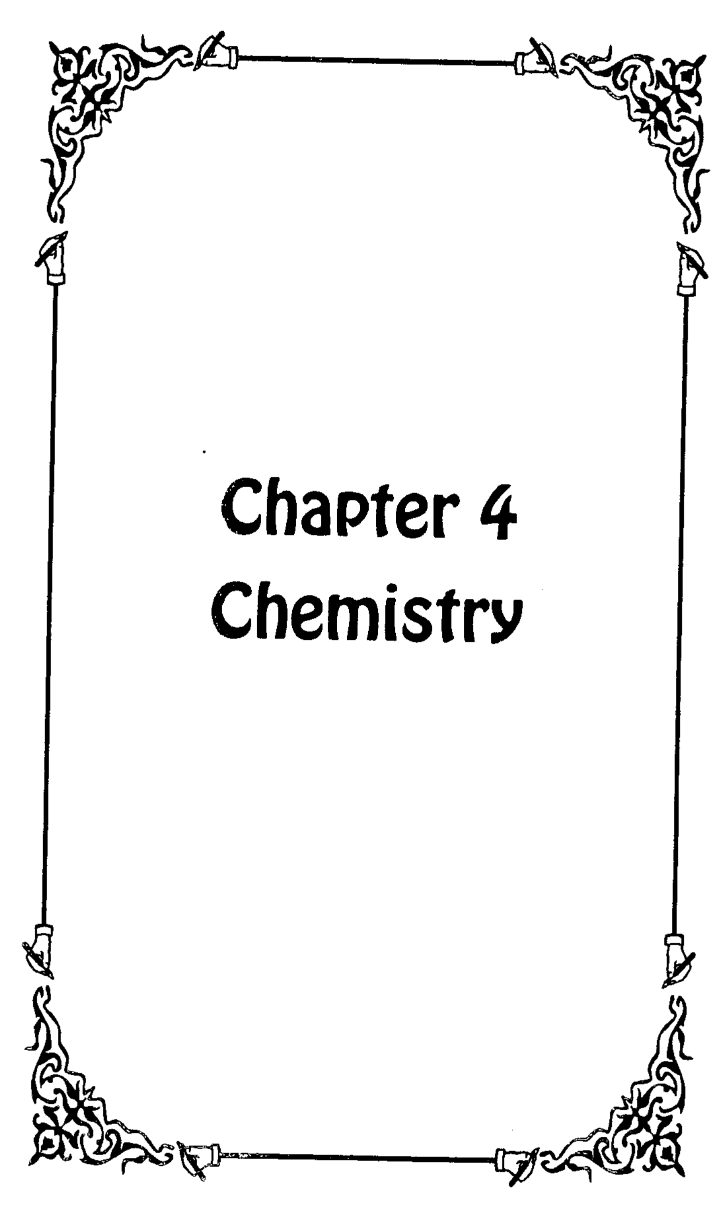
The book "Journey of Al-Kanany" or "Journey of Ibn Gebir" (died in 614 A.H / 1217 A.D) is regarded as the most important source of Arabic Geography and both its importance and influence extended to subsequent genera-

tions Ibn Gebir. Moreover, the influence extended to the modernist scientists of the west, so William Right published it in 1852 in Leaden and Esciabarily translated it into Italian and published it in 1900 in Rome, and De Ghoi published it in 1907 in Leaden. In addition, Amllery translated it into French and published it in Paris.

Yakout Al-Hamawy (died in 626 A.H / 1228 A.D) compiled "Dictionary of Countries". It is not a geographical book concerned merely with countries; rather, it is

a comprehensive synopsis of astronomical, descriptive and linguistic geography. In addition, it is a historical, social and literary encyclopedia. Yakout did not limit himself to only the Islamic world; rather, he was interested in all the known world regions then. Hence, the book, "Dictionary of Countries", became a basic reference which is still reliable for researchers till present. Festinfield published the book in six volumes in Leipzig from 1866 to 1873 besides Arabic publications.

The rest of Muslim Geographers, such as Al-Qizwiny, Abi El-Feda, Ibn Batota, who developed the Arabic geography and led to the emergence of modern geography.



Chapter 4
Chemistry

This chapter discuss gaber Bin Hayan (died 184 A.H / 793 A.D) as a chemistry discipline that benefited humanity. The Greek culture and Alexandria school as well as the Islamic culture were as the cognitive composition from which he emerged, but he concluded to scientific results that differed in quality and quantity, but not rank, from the Greek culture. Gaber contributed to the construction of the experimental method against the rational meditative method in which the Greeks excelled. The issue of

chemistry ability to appear in mind and action equally served as the most fundamental structures around which most of Gaber's chemical research revolved. It clarified the emergence of chemistry in contrast to prohibition or cancellation of this science basically with some scientists and philosophers.

Gaber's experimentalism was not knowledge attained by experience; rather, it consisted of a combination between reason and action as stipulated by modern experimental method formulated

by contemporary scientists of the west. The experimental or inductive method passes through three stages: the first is the investigation stage, the second is the exploration stage and the third is the evidence stage. The rational aspect is represented in the second stage which is exploration and the experimental aspect is represented in both stages the first and third which are investigation and evidence. Gaber asserts that his experimental scientific method was wholly included in his book "Origins" which I have actually

applied by both my hand and mind before till it is proved and I have tested it and it never fails. This is an accurate description of what the modern science researcher does. Gaber combined rational hypothesis and experiment which would come to support or refute it. Gaber would make of the experiment a test for distinction between the scientist and the non-scientist. Therefore, the former reaches through experiment to new results while the latter disable scientific research. Thus, whoever is experimentalist would be a real

scientist and whoever is not experimentalist woyld not be considered as a scientist. It is sufficient with experiment in all industries that the experimentalist industrialist would excel wile the non experimentalist would fail.

If experiment in modern scientific concept provided science with a material basis which proves the point of view of the researcher in the events observed previously by him, Gaber Bin Hayan realized this concept and effectively applied it. Dr. Zaki naguib Mahmoud confirms this when he

states: through looking into his texts, we could get to know his discipline in the procedures taken in the scientific research. They are steps that conform to what all people working in scientific method agree on today. They are summarized in three main stages: the first is that the scientist would inspire from this hypothesis that he assumes in order to interpret the theory which he intends to interpret, the second is that he deducts from this hypothesis results based on it, and the third is that he refers these results to nature

to see if they prove or not his new observations. If they prove them, the hypothesis changes to become a scientific law which could be depended upon its accuracy to predict whatever may happen in nature if certain given circumstances were available.

Gaber bin Hayan did not overlook the role of observation or sensual observation completely as in modern scientific method. Thus, in the first article of the Book "The Great Characteristics", he states:

"You should know that we mention in these books properties of what we saw only and not what we heard or we were told or what we read after we tested and tried out it. Therefore, what was proven valid, we included and whatever was invalid we refuted and we extracted it and scaled it according to what these people said. Hence, sensual observation is the true source of attaining sciences and knowledge. It is also a means of evaluating views of others; thus, what it proves would be accepted

and what it did not prove would be rejected."

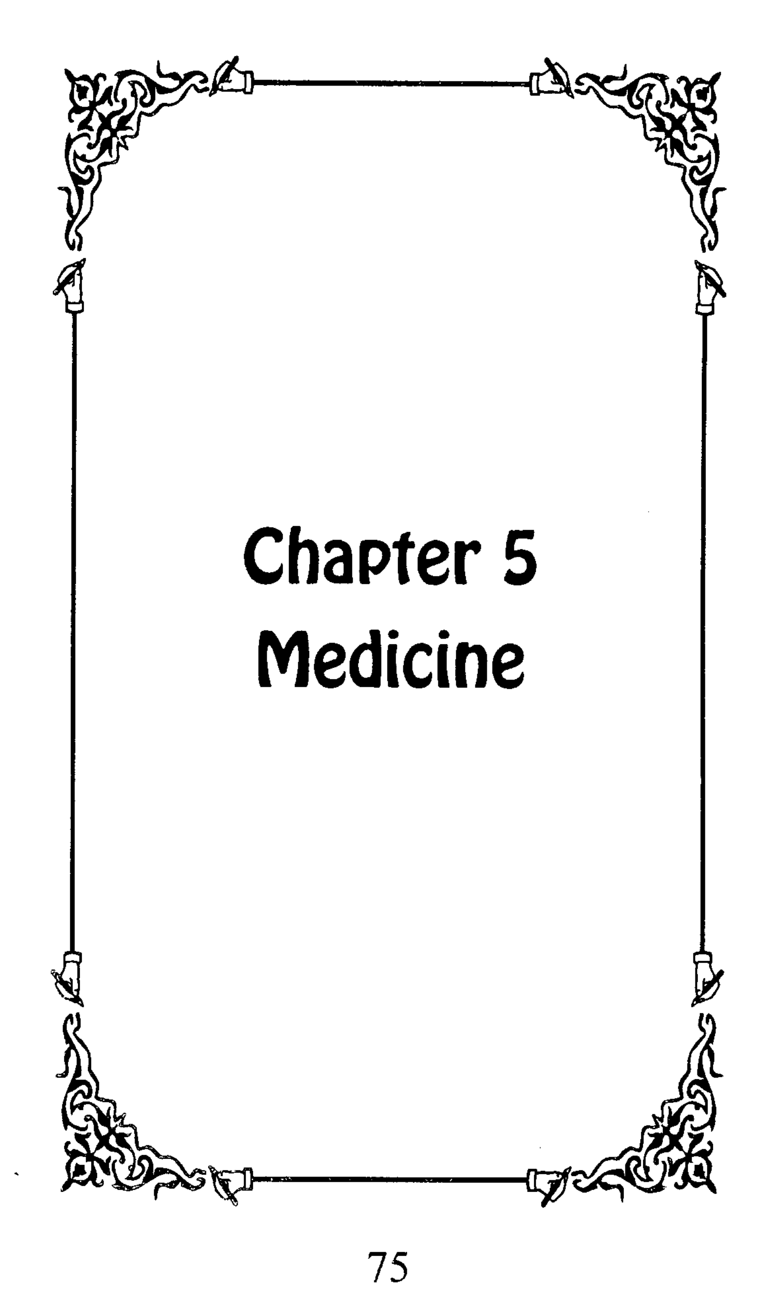
As for Jabir Bin Hayan chemical achievements as well as his compiled books, they have affected greatly subsequent chemists whether at the Arab level or the western level. Jabir is deemed as the most excellent and greatest Arab chemist. He defined many chemical processes such as evaporation, condensation, filtration, calcification, dissolution, crystallization and sublimation. Thanks to his application of experimental method, Jabir Bin

Hayan is considered as the first to prepare sulfuric acid by condensing it from alum and he called it vitriol oil. He extracted nitric acid (silver water) and he was the first to discover sodium hydroxide as well as the first to extract silver nitrate, mercury dioxide, nitro-hydrochloric acid (Royal water). It is attributed to him as well preparation of other compounds such potassium carbonates, sodium carbonates, basal lead carbonates, arsenic and antimony (Kohl : Antimony sulfide). He was the first to

introduce the method of separating gold from silver by dissolving by acid. This method is still used till now for estimation of gold gauges in gold ingots. There are other achievements which made Jabir Bin Hayan the holder of a distinctive chemistry school with important scientific achievements. It constituted the primary and necessary foundations which worked on the progress of developing Arab chemistry after the age of Jabir Bin Hayan. They helped in establishing modern chemistry. This is evidenced by the

fact that the books of Jabir were translated into Latin early by Robert Chester (died in 1144 A.D), Gerard Krimone (died in 1187A.D) and he translated as well "Total perfection" by Jabir bin Hayan into French in 1672 A.D. This led monsieur Bartellor in his book "Chemistry in Middle Ages" published in Paris in 1893 declare that Jabir in Chemistry is a counterpart of Aristotle in Logic. Bartellor published in his book six of Jabir's writings which he considered as representing for the Arab chemistry material which led

to the emergence of modern chemistry. Hence, the influence of Islamic civilization on human civilization is shown clearly in the field of chemistry.



Chapter 5
Medicine

Medicine, is subject of this chapter, which adopt Aba Bakr Al-Razy (died in 313 A.H/ 925 A.D) as a model of it, I have discuss in it: texture of the medical knowledge preceding the age of Al-Razy and the epistemological (cognitive) starting points from which Al-Razy moved and was influenced by the latter, the scientific activity at the age of Al-Razy and Al-razy academic school and the method of scientific research.

Al-Razy found himself in front of the transferred medical

heritage through the translation movement. He had abundant study and he recorded many of his theories in his books. There is nothing more significant than his much use of the word ‘for me’ after the end of the quoted paragraphs from others in most of his books, especially Al-Hawy i.e. ‘The comprehensive’. However, Al-Razy did not acquired the views of the predecessors unless after criticism, review and testing. He rebelled at all that he found in books of views not accepted by the mind and not proven by

observation and experiment. The result provided by Al-Razy in this respect is represented in specific detail of the rational critical aspect. This essentially led to his assertion of a specific test of ideas. This characteristic influenced the doctors who followed him and were influenced by his writings as medicine became for them based on the origins and rules laid by Al-Razy whether in terms of the clinical aspect or educational academic aspect which takes into consideration the method of education and study. This

influence extended later to Europe and the influence of it on doctors during the renaissance age.

As for the method followed by Al-Razy in reaching what he achieved, Al-Razy employed the experimental method based on observation and testing which played a fundamental role as he was intellectually liberated from the influence of the preceding doctrines and theories and he was not satisfied by the agreeing to what they include after approving the experiment of this.

I found at Al-Razy stages of experimental method with its traditional and contemporary forms as he did not examine the sound grounds of the steps of this method (observation, experiment, laying hypotheses and investigating hypotheses). More-over, I found Al-Razy agreeing with scientists of contemporary methods for he approached the modern scientific method known as the deductive hypothetical method. It is based on combining both inductive and inferential methods. I have presented the texts

indicating this by which showed that Al-Razy conformed to what he achieved by applying this method.

The preceding medical heritage of Al-Razy with his education at the hands of his professor Abi Al-hassan Aly Bin Rien Al-Tabry the cognitive fundamentals or the Epistemological starting points which determined the thinking of Al-Razy later from which he concluded to new knowledges when he reached the stages of maturity and innovation. Al-Razy brought scientific and original

treatment views and discoveries that expressed really the spirit of Islam and its scientific civilization during its flourishing ages. They had profound influence on the successive physicians of Islamic civilization and the doctors of the western world or the other in modern ages. Al-Razy's book, 'Al-Hawy' is considered as the most important encyclopedia in medical and therapeutic field which profoundly affected scientific thought in the west as it has often been regarded as the greatest book

of medicine at all till the end of modern ages.

Al-Razy was the first to describe smallpox and measles and provided the appropriate medications for them. He was the first to invent surgery sutures that were called ‘Qasab’. Moreover, he was the first to use wound suppository and animals intestines to stitch wounds. He was the first to perform wound stitching by Oud strings. Al-Razy was the first to be interested in surgery as an independent branch of medicine. His renowned ‘Al-Hawy’ includes

a description of surgical operations that hardly differ from their counterparts in modern age. He was also the first to describe the operation of extracting water from eyes. Furthermore, he discovered new methods of treatment as he was the first to use the tubes in which pus, matter and toxic secretions. He was able to differentiate between venous and arterial bleeding and he used bandage for arterial bleeding. Moreover, he was the first to use belts for treating hernias. Al-Razy was the first to use white lead in

ointments. He introduced mercury in preparing laxatives, and he used medications that modern medicine depends on till our present time. He applied opium in treatment especially in whooping and dry coughing cases. Modern pharmacology books state that opium contains several bases or semi-bases such as morphine and codeine and noscabiene s used to stop dry coughing especially codeine which all suppress coughing center in the brain. Besides, Al-Razy employed the method of evaporation in treatment

and it is used till our present day by placing volatile oils in hot water so that the patient would breathe it in. These rising vapors widen the windpipes; thus, air passages expand. It was Al-Razy who was the first to introduce mercury in preparing laxatives. He contributed to the field of diagnosis by rules which have their importance till today such as continual observation of the patient and the therapeutic testing; that is the patient is administered a medication and watch its effect and directed to the diagnosis according

to this effect, as well as the importance and precision of investigating the patient. The doctor should not overlook anything that may arise of his illness internally and externally. They also include caring of checking the patient taking into consideration that the body is a coherent unit of organs. If any organ is disabled, other organs would be affected severely.

Al-Razy's basic theory of diagnosis depended chiefly on the enquiry concerning the difference between the diseases. Among the

real contributions presented by Al-Razy for medicine is his differentiating between diseases of similar symptoms. This is called Diff Diagnosis which is based on the knowledge and experience, long practice, strength of the observations and success of experiments of the doctor and all this was available in Al-Razy.

In whole, Al-Razy presented pioneering medical and therapeutic contributions that helped in the progress of medicine and by which humanity benefited in a way that cannot be denied. Al-Razy is the

authority of medicine in the world since his age and till modern ages according to the acknowledgment of the westerns themselves.

I illustrat the extent of the influence of successor Muslim medicine scientists in modern western civilization. Ibn Al-Gazar (died in 395 A.H/ 1005 A.D) who was known to the west by 'Algazirah' and was benefited by his writings of which African Constantine translated the book of 'Zad Al-Mosafer' under the title Kiaticum Pereginatis and after this translation, there was in Sicily a

Greek translation entitled 'Ephadia'

The book 'Kamel Elsenaah' by Aly Bin Al-Abas (died in 384 A.H/ 944 A.D) was famous in latin by the name 'Royal Book' is considered among the most important and famous books of medicine that appeared in the fourth century A.H. Aly Bin Al-Abas wrote it including twenty articles in sciences of theoretical and scientific medical sciences and he categorized its sections well. Therefore, it came out better than Al-Mansoury book by Al-Razy,

the approved textbook then. Students of science were committed to study the book till the book of “Law” by Ibn Sina and the “royal in work more fluent and law in science more valid.

The twenty articles of the book contain important researches and chapters in surgery and anatomy, treatments and natural and environmental matters and the effect and influence of medications whether plant or mineral in addition to the effect of toxins in natural powers of the body. In anatomy, we see Aly Bin Al-Abas

presenting an accurate definition and description of veins and arteries, functions of the heart and respiration and digestion system addition to a description of senses and the method they perform their functions. Moreover, he indicated the importance of practicing sport as they produce body preservation through strengthening organs and their potency.

The book clearly shows that Arab doctors determined the powers of medicines of three which Aly Bin Al-abas mentioned

in his book and became a reference of subsequent doctors:

(1) the first power are compounds
(2) the second power are: the maturing, soft, hardening, closing, opening, bringing, condensing, opening of veins mouths, decreasing of flesh, attracting, alleviating of pain
(3) the third power are the crumbling of stones, running of urine, menstruation, helping to

secret what is in the chest, generating semen and milk.

Whoever wishes to know about these must be well aware of laws by which each of individual medicines is tested and its combination, strength and benefit to the body are deducted.

Aly Bin Al-Abas depended in his medical practice on presenting health and he considered prevention as better than treatment and nature is no less in its ability to repair the body than the doctor. Furthermore, physical strength is a

necessity for the patient. He is deemed as the first to assert the difficulty of curing the patient of pneumonia due to the movement of the lung based on the fact that the sick organ needs quietness which is not available in the constantly moving lung due to respiration.

From all the above-mentioned, the importance of the book 'Kamel al-sanaah' by Aly Bin Al-Abas as well as the extent of its influence in the successive ages is revealed. This influence extended to the west at the

beginning of modern ages as this book was among the basic textbooks in the European faculties of medicine in addition to Al-Razy's book 'Al-Hawy', 'Law' by Ibn Sina and 'Dealing' by Abi Al-Kassem Al-Zahawy, Al-Tayseer by Ibn Zahr till the sixteenth century. It is noteworthy that Constantine, the African, (died in 1087) –the bold thief as he was called in the history of science-translated the book 'Kamel Al-Sanaah' into Latin and was published after his name. The book continued to be taught for

European students of medicine till 1127 A.D when another translation of the book appeared done by the Antakian Illias Estafian in which he mentioned the name of the real author of the book Ali Bin Al-Abas.

Al-Zahrawy (died 404 A.H / 1013 A.D), author of the book "Dealing for whoever is unable to write" was the first to bandage arteries, described bleeding and readiness of some bodies for it (Hemophilia). He was the first to conduct excision of the stones of bladder in women through the

vagina and discover a mirror for the vagina and an instrument to widen the uterus for operations and another to crush stones in the bladder and research in arthritis. He was also the first to succeed in the incision of the windpipe (Trachomi). In addition he succeeded in stopping the bleeding by bandaging large arteries. This is considered as a great scientific victory which the famous French surgeon Ambroise Bary claimed to achieve for the first time in 1552 whereas Al-Zahawy accomplished

and taught to his disciples six hundred years before this.

If the medical researches proved that the bile helps to stop the reproduction of bacteria, Al-Zahawy found this at his time, he used to sterilize and disinfect the tools used in surgical operations by dipping them in bile. His interest in sterilizing and disinfecting tools from their frequent use in anatomy is considered as the subject of his principal interest.

Alzahrawy recommended in all surgical operations conducted

on the lower half of man to lift the pelvis and legs before taking any actions. This method was imitated directly from him by the west and made frequent use of it till present. However, it was falsely and erroneously attributed to the German surgeon Trend Lanburg and was named after him without any mention of the great Moslem surgeon. Seven years before Bersival Bout, Al-Zahawy was concerned with arthritis and the pneumonia that afflicts the backbone which was later named after the English doctor Bout

‘Bouty Disease”. Nevertheless, the west could not ignore the pioneering role of Al-Zahrawy in surgery; in addition to his mastery of diseases of the eyes, nose, ear, larynx and urinary and productive passages. Hence, he was called “Father of Surgery”.

The ‘Law in Medicine’ by Ibn Sina (died 428 A.H / 1038 A.D) was among the Arab medicine that included five parts. The first part was allocated to total matters as it dealt with limitations, subjects, aspects, combinations and mixtures of medicine and the

identity of an organ and its parts, bones and muscles and categorization of diseases and their causes in general and the general methods of treatment such as laxatives and bathes... etc. The second part was assigned for medical vocabulary and divided into two parts: the first studies definition of medication, its properties and effect of each drug on each organ of the body. The second lists vocabulary arranged alphabetically and the third part was allocated for the diseases of each part of the body from the

head to the foot. As for the fourth part, it discusses the diseases which are not limited to an organ such as fevers and some other matters such as tumors, blisters, leprosy, fracture, casting and beautification.

In the fifth part, there is a study in compounded drugs. Law in Medicine was frequently translated, so it was translated into Arabic, was printed in Naples in 1492 A.D and in Venice in 1544 A.D. Gerard Karimone translated it from Arabic into Latin. Karimone states that he spent approximately

half a century learning Arabic language. The law of the President Sheïkh was the greatest book in which I confronted tire and fatigue and I exerted a lot of effort in translating it.

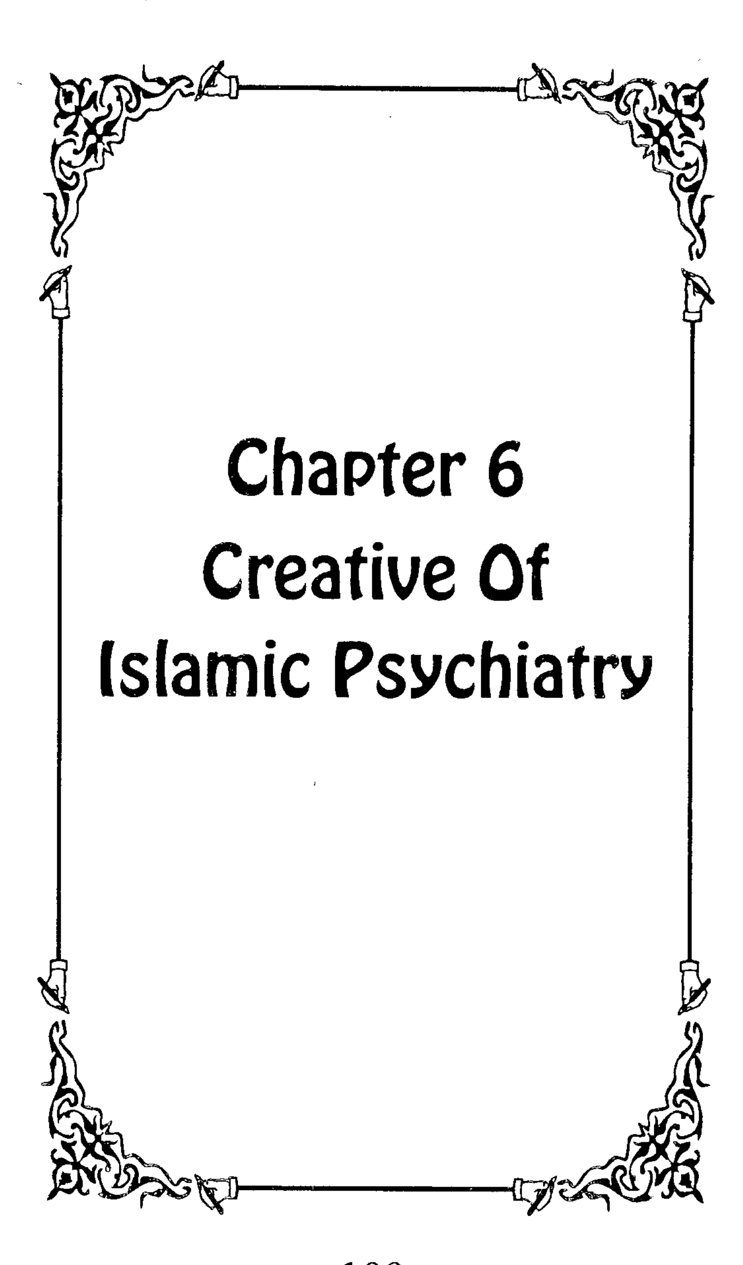
Al-Bago translated the Law in the beginning of the sixteenth century. This translation was characterized by its inclusion of a glossary of technical terms which Ibn Sina used. This translation was published in 1527. Jaan Paul Mongos translated the "Law" accurately and professors of medicine and their students all

over the world depended on this translation throughout a long period of the middle ages. It can be concluded that Law in Medicine by Ibn Sina was printed in Latin more than sixteen times during thirty years of the fifteenth century A.D and was printed twenty times in the sixteenth century A.D. However, no reviewed edition was printed of it till this moment.

The modern western civilization benefited by the achievements of Bani zahr. As Abo Marwan Bin Zahr (died 557 A.H / 1161 A.D) is considered the

first to produce a clinical description of inflammations of the skin and the heart sac. He was the first to invent the anal nutrient injection and artificial nutrition for different cases of stomach paralysis. In addition he is considered as the first to apply a hollow tube of zinc to feed patients who have a problem of ingestion and presented a full comprehensive description for stomach cancer and other medical and therapeutic achievements which benefited the west and called their inventor by the name "Avenorar". The west

considered him grater than Ibn Sina and there is no one equal to him in the east except Al-Razy. They both presented great achievements which benefited humanity collectively exactly like the case of Ibn Al-Nafees who introduced his discovery of minor cycle to the whole world; however, it was not disclosed till the beginning of the twentieth century.



Chapter 6
Creative Of Islamic Psychiatry

In this chapter I try to include the evidence supporting and proving and justifying this title so that it may be clarified and show the extent of the steps taken by Arab and Muslim doctors in the field of psychiatry. We saw how.

This important and vital branch of medicine is considered a pure Islamic Arab invention. In Greek civilization, it was thought that in order to be cured of psychological disorders, a patient should sleep in a special shrine where his recovery would be made by a miracle that befalls his body

in the single night which he would stay in this shrine. If this miracle does not occur, the patient would not be cured all his life.

In the western middle ages, patients of these diseases were treated the worst. They were placed in dark prisons with hands and feet tied up. They were taken care of by cruel men who use only language of hitting and torture for lifelong. The cause of this for the westerns then was the prevailing belief that this patient was cursed by heaven as a punishment for a sin he committed; thus heaven

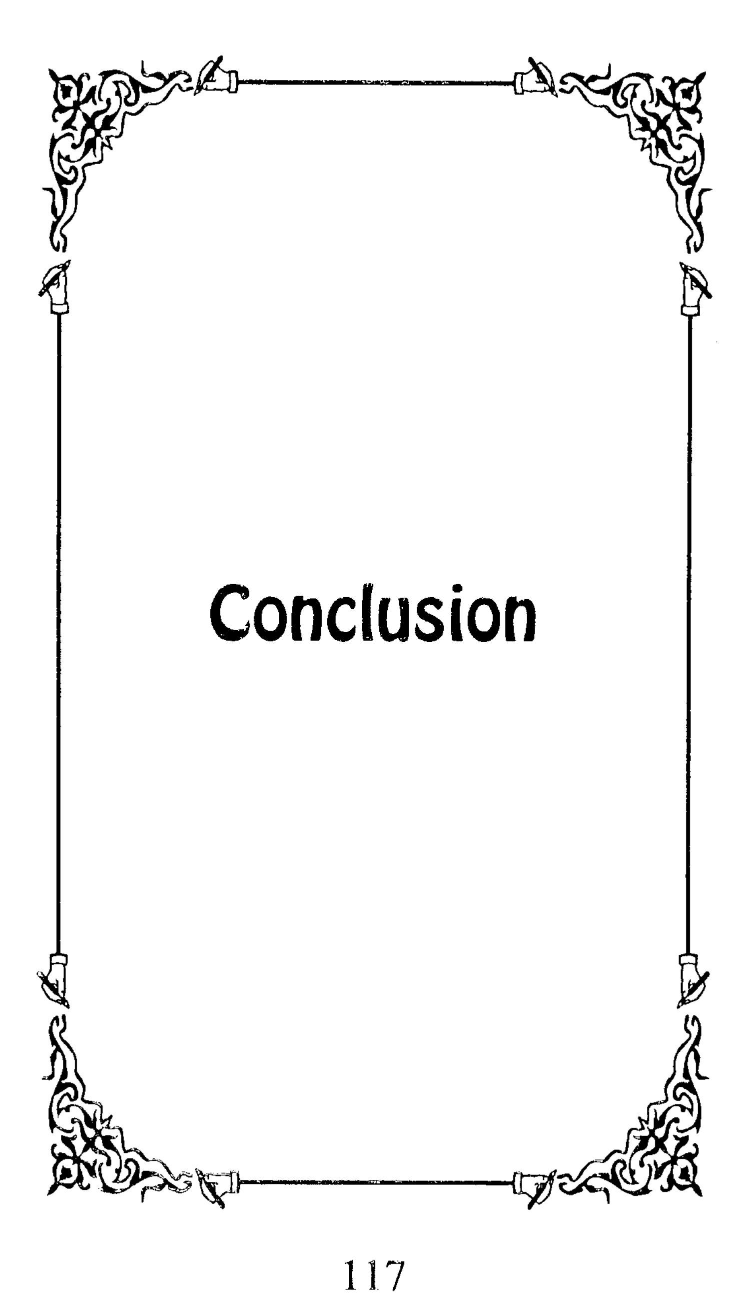
afflicted this disease upon him or a shrewd devil befell the body of this patient. Hence, it is right to torture this body for it hosts a deceitful stoned devil.

As for Arab and Muslim physicians, they attempted treating the psychological disorders and produced many innovative therapies that helped for their cure. I brought many examples to confirm the extent of their seriousness and originality.

Al-Razy thought as the first doctor in treating patients whose

cure is hopeless, so he was a pioneer in this field. Among the diseases which his predecessors thought were impossible to be cured and which he treated were psychological and mental and neurological disorders especially epilepsy and melancholia. In addition Al-Razy realized the effect of the psycholog ical factor on the patient's health, not only this, but also on casuing physical diseases. Thus Al-Razy was aware of what is called today psychomatic diseases, subject of

interest of the most modern branch
of medicine.



Conclusion

From all the above-mentioned, it is shown that the great scientific work presented in this book indicates that the Islamic civilization occupies a remarkable position among different civilizations of the world. This is due to what it presents to the whole humanity, especially its sciences which the whole world benefited from. It formed a strong firm basis upon which the modern western civilization is established. Thus, the other should never underestimate the Islamic civilization and should keep

respecting and protecting it instead of its wild attacks now and then to destroy it. This is the final result to which the current study concludes.

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